Author's response to reviews

Title: Evaluating implementation of methicillin-resistant Staphylococcus aureus (MRSA) prevention guidelines in spinal cord injury centers using the PARIHS framework: a mixed-methods study

Authors:

Salva N Balbale (Salva.Balbale@va.gov)
Jennifer N Hill (Jennifer.Hill3@va.gov)
Marylou Guihan (Marylou.Guihan@va.gov)
Timothy P Hogan (Timothy.Hogan@va.gov)
Kenzie A Cameron (k-cameron@northwestern.edu)
Barry Goldstein (Barry.Goldstein@va.gov)
Charlesnika T Evans (Charlesnika.Evans@va.gov)

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Author's response to reviews: see over
July 31, 2015

Nick Sevdalis, PhD
Associate Editor, Implementation Science
c/o BioMed Central
236 Gray's Inn Road
London WC1X 8HB
United Kingdom

Dear Dr. Sevdalis,

Thank you for sharing the most recent reviewer comments regarding the manuscript entitled “Evaluating implementation of methicillin-resistant Staphylococcus aureus (MRSA) prevention guidelines in spinal cord injury centers using the PARiHS framework: a mixed-methods study.” Please find enclosed the revised manuscript and a response to the reviewers addressing each comment, point-by-point, below. We have attempted once again to thoroughly address each comment in the revised manuscript while adhering to the formatting guidelines for Implementation Science. All changes made in the manuscript have been tracked.

Response to Reviewers' comments:

Reviewer #1:

1. Is the question posed by the authors new and well defined?
As per the other reviewer's comment, this combination of setting and the type of guidelines is a novel one. The time period is now better specified.

RESPONSE: We appreciate the reviewer’s most recent comments on our revised manuscript, and are pleased to address the remaining comments in our resubmission.

2. Are the methods appropriate and well described, and are sufficient details provided to replicate the work?
Both reviewers picked up on the absence of MPC data. The rationale for excluding MPC data from the manuscript is given in the authors' response letter. Given that the focus of the manuscript is the factors affecting guideline implementation, the MPC data would still seem pertinent, although the authors are in the best position to judge this. A brief explanation of their decision should feature in the manuscript itself (Methods), as readers are likely to question this too.
RESPONSE: Although we agree with the reviewers that our MPC data would have made a useful addition, we still believe that the nature of these data would not be informative as far as describing factors affecting guideline implementation. As the reviewer suggests, we have now included the following statements regarding this decision in the Methods section on Pages 7-8: “Survey data were collected as part of a broader effort to characterize MRSA prevention practices in SCI/D Centers following guideline release. MPC survey data were omitted from our analysis as these data did not focus on perceptions of guideline implementation.”

3. Are the data sound and well controlled?
Both reviewers had some questions about the Chi square tests in the original manuscript. The authors have tried to address my concern that the significant difference across staff groups was prematurely attributed to differences in the nurse data. However, they have done so in a way (using nurse data as a reference point and then comparing that to other groups) that still does not account for multiple post-hoc comparisons and the increased likelihood of false positive results. If anything, this is introducing further post-hoc comparisons. A single post-hoc adjustment would be appropriate, and not particularly onerous. I have conferred with colleagues who agree. A statistical review would be appropriate.

RESPONSE: We thank the reviewer for raising this issue. To address the concern of type I error/false positive results, we have now used a Bonferroni correction in our comparisons of perceived level of implementation across provider groups. We required a p-value of p=0.017=0.05/3, given the three tests/comparisons (nurses vs. physicians; nurses vs. all others; and physicians vs. all others). Using this p-value to assess statistical significance, only the comparison of nurses vs. all other positions achieved significance. We have added the following text to explain this step on Page 10 in the Methods: “Analysis of perceived level of implementation and guideline awareness across provider types involved multiple comparisons; to minimize the possibility of type I error, we applied a Bonferroni-corrected alpha level as the criteria of statistical significance for these tests. We used an alpha level of 0.017 for comparisons of perceived level of implementation across provider groups; and an alpha level of 0.008 to compare guidelines awareness across provider groups.” We have also updated the corresponding text and added the new p-value in the Results on Page 12: “Nurses were significantly more likely to report full implementation of the guidelines compared to other positions at the Bonferroni-corrected alpha level of p<0.017, but were similar in comparison with physicians (Table 1); no significant difference was found between physicians and other positions (p=0.258).” Of note, we have not included this new p-value in Table 1 as it would require the addition of an entire new column; however it is shown below for reference. We welcome additional feedback from the reviewer around our analyses.

<table>
<thead>
<tr>
<th>SCI/D Provider Characteristics by Perceived Degree of Implementation</th>
<th>n=228</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fully Implemented</td>
</tr>
<tr>
<td>Position at the VA</td>
<td>63 (65.63)</td>
</tr>
<tr>
<td>Nurse</td>
<td></td>
</tr>
</tbody>
</table>
Using a similar method, the authors describe "a mild trend showing that physical therapists & assistants were less likely to be aware of the guidelines compared to nurses". The p-value may reflect a chance finding of multiple comparisons, and phrases like "mild trend" should be avoided in any case. The authors could still retain their point that further investigation of targeting efforts to hands-on providers might be helpful, especially in view of their interview findings that therapists/assistants generally didn't learn about the guidelines.

**RESPONSE:** Similarly, we have now used a Bonferroni-corrected alpha level in our comparisons of guideline awareness across provider groups. Given six tests/comparisons (nurses vs. physicians; nurses vs. physician assistants/therapists; nurses vs. all others; physicians vs. physician assistants/therapists; physicians vs. all others; and physician assistants/therapists vs. all others), we required a p-value of $0.05/6=0.008$ to achieve statistical significance. Using this corrected alpha level, we found no statistically significant difference in guidelines awareness across provider groups. We now explain the use of the Bonferroni-corrected alpha for these comparisons (as well as those examining perceived implementation across provider groups) on Page 10 in the Methods (please see response above). Additionally, we have now removed the sentence referenced by the reviewer regarding the “mild trend” in the Results on Page 13 and added the following text: "We did not find a statistically significant difference in guideline awareness across provider types." As in the previous response, we have not included these new p-values in Table 4 as they will expand the table considerably; however we show them below for the reviewer’s reference. We maintain in the Discussion, per the reviewer’s comment, that targeted efforts to enhance guideline awareness among SCI/D providers would be helpful.

<table>
<thead>
<tr>
<th>Provider characteristic</th>
<th>Aware of guidelines</th>
<th>Not aware of guidelines</th>
<th>p-value (Chi-square)</th>
<th>p-value (Chi-square)</th>
<th>p-value (Chi-square)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provider type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nurse</td>
<td>89 (69.0)</td>
<td>40 (31.0)</td>
<td>Ref</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physician</td>
<td>16 (61.5)</td>
<td>10 (38.5)</td>
<td>0.458</td>
<td>Ref</td>
<td></td>
</tr>
<tr>
<td>Physician Assistant/Therapist</td>
<td>35 (55.6)</td>
<td>28 (44.4)</td>
<td>0.068</td>
<td>0.604</td>
<td>Ref</td>
</tr>
<tr>
<td>Other</td>
<td>5 (50)</td>
<td>5 (50)</td>
<td>0.216</td>
<td>0.529</td>
<td>0.743</td>
</tr>
</tbody>
</table>

**Minor Essential Revisions:**

4. Abstract Background: should read "...prevention guidelines in VA SCI/D Centers approximately 2-3 [YEARS] after the guidelines were released."
RESPONSE: We thank the reviewer for highlighting this error. We have now corrected this in the Abstract Background on Page 3.

5. Remove references to "mild trends" where p values are >0.05

RESPONSE: We have removed the reference to the “mild trend” in the Results on Page 13.

6. 2nd paragraph of Background: should read "patients with chronic and complex health needs, such as those [WITH] SCI/D..."

RESPONSE: We have now corrected this error in the Background on Page 5.

7. 5th paragraph of Results: remove "approximately" if quoting survey results to one decimal place (36.8%)

RESPONSE: We have now amended this sentence in the Results on Page 13 to remove the word “approximately.”

8. 4th paragraph of Discussion: should read "a key lesson from this and other studies is that [IMPROVING] perceptions and attitudes alone may not be sufficient"

RESPONSE: We have now added the word “improving” to this sentence in the Discussion on Page 21.

Reviewer #2:

1. I am satisfied that all the proposed revisions that I suggested have been made satisfactorily with the exception of my recommendation that the numerical data in Table 2 is extended to include the second group which the authors highlight in their cover letter:

secondly the numerical data in Table 2 is difficult to interpret as the second group (e.g. ‘not agree’, ‘not seen’) for each question is omitted, which requires the reader to calculate the count (first group count/percentage) in order to reach n=228;

RESPONSE: We chose to present Table 2 this way in order to streamline the results and focus on the comparisons between provider perceptions of fully versus not fully implemented guidelines. We felt that including the second group would not add value as far as the purpose of this table to draw these comparisons, and would simply increase the size of the table significantly. However, we will be happy to add the second group for each result if the reviewer still feels that this is essential.
As the tables are much improved through the revision process, I do not feel it is essential for the second group to be added.

**RESPONSE:** We thank the reviewer for her feedback on the tables and our revised manuscript as well.

2. The revisions to the qualitative section and the addition of appendix 2 & 3 have made a substantial improvement to the insights that can be gained from applying the PARIHS framework.

**RESPONSE:** We sincerely appreciate the reviewer’s suggestions, and are pleased that our revisions and addition of the appendices have strengthened the qualitative results section.

Minor essential revisions:

3. P1, Para 1, missing 2-3 ‘years’

**RESPONSE:** We have now corrected this error in the Abstract Background.

4. P8 second paragraph 'survey' questions – might be clearer as 'interview' questions

**RESPONSE:** We have now changed this to read “interview” questions as suggested by the reviewer.

5. P33 – ‘Ref’ code in table 1, section 'SCI/D Provider Characteristics by Perceived Degree of Implementation' last column heading p-value.

**RESPONSE:** “Ref” denotes the reference group for chi-square tests we conducted (based on earlier review comments from Reviewer #1) to compare perceived degree of implementation across multiple provider groups. In our understanding, it is common to indicate to the reader the reference group in the p-value column, particularly in an effort to minimize unnecessary expansion of the tables.

Please do not hesitate to contact me should you have any questions or need additional information regarding the manuscript or our resubmission.

Thank you sincerely for your time and consideration.

Best regards,

Charlesnika T. Evans, PhD, MPH
Director, Spinal Cord Injury Quality Enhancement Research Initiative (SCI QUERI)
Research Health Scientist, Center of Innovation for Complex Chronic Healthcare (CINCH)
Associate Epidemiologist, National Center for Occupational Health and Infection Control (COHIC)
Edward Hines Jr. VA Hospital (151H, Building 1, D302), Hines, Il 60141
Phone: (708) 202-4868, Fax: (708) 202-2499, Email: Charlesnika.Evans@va.gov

Associate Professor, Department of Preventive Medicine and Center for Healthcare Studies
Institute for Public Health and Medicine (IPHAM), Feinberg School of Medicine
Rubloff Building, 10th Floor
Northwestern University, Chicago, Il 60611
Email: Charlesnika-Evans@northwestern.edu